

A method for monitoring fabrication processes of finely structured surfaces in a semiconductor fabrication includes the steps of providing reference signatures of finely structured surfaces, measuring at least one signature of a test specimen surface, comparing the measured signature with the reference signatures, and classifying the test specimen surface by using the comparison results, wherein the measurement of the reference signatures is carried out by measuring the local distribution and/or intensity distribution of diffraction images on production prototypes having a specified quality. The classification is preferably carried out here with a neural network having a learning capability and/or a fuzzy logic. Furthermore, a device for carrying out the method is provided.

- 55 -